



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/506,956	03/24/2005	C. Mauli Agrawal	5660-00503	8795
35690 7590 11/12/2009 MEYERTONS, HOOD, KIVLIN, KOWERT & GOETZEL, P.C. P.O. BOX 398 AUSTIN, TX 78767-0398				
EXAMINER NAFF, DAVID M				
ART UNIT 1657		PAPER NUMBER		
NOTIFICATION DATE 11/12/2009		DELIVERY MODE ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patent\_docketing@intprop.com  
ptomhkk@gmail.com

### Office Action Summary

**Application No.**

10/506,956

**Applicant(s)**

AGRAWAL ET AL.

**Examiner**

David M. Naff

**Art Unit**

1657

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 July 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 5-9, 11-14, 16-23, 32 and 63 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 5-9, 11-14, 16-23, 32 and 63 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

A response of 7/23/09 to an office action of 1/23/09 amended claims 1, 11, 13, 14, 16-18, 32 and 63, and canceled claims 24-27 and 29-31.

Claims examined on the merits are 1, 5-9, 11-14, 16-23, 32 and 63, which are all claims  
5 in the application.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness  
rejections set forth in this Office action:

10 (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15 This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later  
20 invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 5-9, 11-14, 16-19, 21, 23, 32 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al (4,927,676) in view of Mineau-Hanschke (6,582,391), and Mineau-Hanschke (6,419,920), and if necessary in further view of Lee et al (6,033,582),  
25 Hoffman et al (5,034,265 or 5,055,316).

The claims are drawn to method of preparing an implant by treating a bioresorbable polymeric substrate with a gas-plasma treatment by exposing the substrate to a reactive gas comprising oxygen at a supplied energy during gas-plasma treatment of between about 5 kJ

and about 10 kJ, and exposing the treated substrate to living cells so a portion of the cells become coupled to the substrate, and wherein the coupled cells produce more of a product than cells coupled to an untreated substrate, and the cells produce vascular endothelial growth factor (VEGF) as least one cellular product.

5 Williams et al disclose attaching endothelial cells to a substrate by treating the substrate with a gas-plasma before attaching the cells (col 2, under "SUMMARY OF THE INVENTION", and col 4, lines 48-59). The gas used can be oxygen (col 4, line 51), and a preferred gas is a mixture of ammonia and oxygen (col 5, lines 31-32). The substrate with the attached cells is implanted.

10 Mineau-Hanschke ('391) discloses implanting a matrix containing cells that produce a medically useful polypeptide (col 4, lines 17-31). The polypeptide can be endothelial cell growth factor (col 20, lines 28-28).

Mineau-Hanschke ('920) discloses implanting a matrix containing cells that produce a medically useful polypeptide (paragraph bridging cols 1 and 2 and paragraph bridging cols 2  
15 and 3). The polypeptide can be vascular endothelial growth factor (VEGF) (col 33, claim 22).

Lee et al disclose surface modification of medical implants by gas-plasma treatment using oxygen as the gas.

Hoffman et al ('265) disclose using gas-plasma treatment to improve compatibility of biomaterials.

20 Hoffman et al ('316) disclose gas-plasma treatment of a surface to provide tight binding of proteins to the surface.

It would have been obvious to use cells that produce VEGF as the cells attached to the substrate implanted by Williams et al to obtain the function of VEGF as a medically useful polypeptide produced *in vivo* by cells contained by a matrix as suggested by Mineau-Hanschke

('391) and Mineau-Hanschke ('920). It would have been within the skill of the art and obvious to select a preferred energy within the range of energy conditions disclosed by Williams et al (col 5, lines 17-23). Lee et al and Hoffman et al ('265 and '316) further disclose gas-plasma treatment of a substrate, and if needed would have suggested conditions that can be used.

- 5 Cells attached to the plasma treated substrate will inherently produce more product than cells attached to an untreated substrate. The conditions of dependent claims would have been obvious from conditions disclosed by the references. Mineau-Hanschke ('920) would have suggested a polylactide polymeric material required by claims 5 and 63 by disclosing polylactide/glycolic acid co-polymer as a substance from which a solid substrate can be made
- 10 (col 4, lines 28-29). A time required by claim 12 and temperature required by claim 13 is within the range of conditions disclosed by Williams et al (col 5, lines 16-24).

***Claim Rejections - 35 USC § 103***

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1, 5-9, 11-14, 16-19, 21, 23, 32 and 63 above, and further in view of

15 Berlowitz-Tarrant et al (5,840,387).

The claim requires human aortic endothelial cells.

Berlowitz-Tarrant et al disclose attaching aortic endothelial cells to a surface that can be an implant (col 5, lines 40-65).

- 20 When using cells that produce vascular endothelial growth factor as the cells of Williams et al as set forth above, it would have been obvious to use aortic endothelial cells as the cells as suggested by Berlowitz-Tarrant et al disclosing attaching aortic endothelial cells to a surface for implanting.

### ***Claim Rejections - 35 USC § 103***

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1, 5-9, 11-14, 16-19, 21, 23, 32 and 63 above, and further in view of Smith et al (5,580,779).

5 The claim requires myocardial cells.

Smith et al disclose using myocardial cells to produce a peptide *in vivo* (col 5, lines 3-8).

When using cells that produce vascular endothelial growth factor as the cells of Williams et al as set forth above, it would have been obvious to use myocardial cells to produce a peptide as suggested by Smith et al.

10 *Response to Arguments*

The amendment urges that Hoffman et al and Lee et al do not disclose a gas-plasma treatment between about 5 kJ and about 10 kJ. However, Lee et al disclose using power between about 10 and about 200 watts (col 13, line 17) and Hoffman et al ('265) disclose using 5-100 watt energy (col 5, line 64). Evidence has not been presented establishing that about 5 kJ and about 10 kJ is not in the watt range disclosed by Lee et al and Hoffman et al. In any event, Lee et al and Hoffman et al are combined with Williams et al, and evidence has not been provided establishing about 5 kJ and about 10 kJ is not within the conditions disclosed by Williams et al of 0.001 to 400 watts for 2 seconds to 12 hours at up to 100 megahertz and 0-200 °C, or 0.01 to 200 watts for 5 seconds to 120 minutes at 5 to 30 megahertz at 10-50 °C (col 5, lines 16-20). The present specification discloses using watt energy range between about 25 watts and about 250 watts and a time of 1 minute to less than 5 minutes (page 5, lines 27-34) which are condition within ranges disclosed by Williams et al.

The amendment urges that it has been discovered that supplied energy during plasma treatment has a significant effect on formation of radical groups formed on the surface of the

substrate as shown by Tables 1, 2 and 4. However, procedures that provided results of the tables used a DL-PLA substrate, only oxygen as the gas, a temperature less than 50°C, a pressure between about 0.01 torr and about 10 torr and a discharge frequency between about 13 MHz and about 14 MHz. Conditions of the claims are not commensurate in scope with

5 conditions used to provide results shown by the tables. It cannot be assumed the same result of oxide radical production as shown by the tables will be obtained when using other substrates, oxygen in any amount in a mixture with other gases, a temperature above 50°C, and at a different pressure and frequency for a different time. Following the teachings of Williams et al will inherently produce radical groups as when using between about 5 kJ and about 10 kJ as

10 claimed. Williams et al apparently recognized that one would want to vary the energy for a particular situation to obtain optimum results, or otherwise ranges of conditions would have not been disclosed. To select preferred optimum energy conditions within ranges of Williams et al for a particular situation would have been within the ordinary skill of the art. The fact that applicants have discovered that energy conditions used in the ranges of Williams et al effects

15 the formation of radical groups does not make unobvious the use of energy conditions within the ranges of Williams et al.

The amendment urges that the invention has disclosed a narrow energy range that is critical for producing oxide radicals within the broad ranges of Williams et al. However, as set forth above, the claims do not require conditions that are commensurate in scope with

20 conditions used to produce the results of the tables. The conditions of the claims would not have to produce a content of oxide radicals as shown by the tables when using energy in the range of about 5 kJ and about 10 kJ.

Claim 1 would be free of the prior art if amended to contain conditions commensurate in scope with conditions used to produce results of the tables by replacing lines 2-6 with ---

subjecting a bioresorbable polymeric substrate consisting of poly(DL-lactic acid) to a gas-plasma treatment at a supplied energy during treatment between about 5 kJ and about 10 kJ by subjecting the substrate to a reactive gas consisting of oxygen for a duration from about 1 minute to less than about 5 minutes at a temperature of less than about 50 °C and a pressure of  
5 between about 0.01 torr and about 10 torr, and a discharge frequency between about 13 MHz and about 14 MHz; and ---.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

10 A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will  
15 be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Naff whose telephone number is 571-272-0920. The examiner  
20 can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Manjunath Rao can be reached on 571-272-0939. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David M. Naff/  
Primary Examiner, Art Unit 1657

10

DMN  
11/7/09